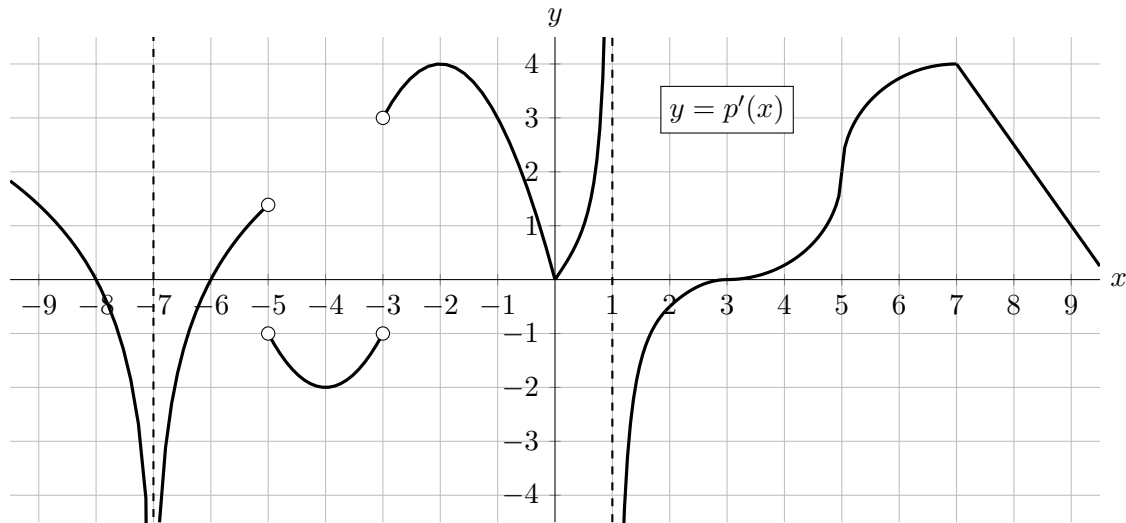


9. [12 points] A function $p(x)$ is defined and continuous on $(-\infty, \infty)$. A portion of the graph of $p'(x)$, **the derivative of $p(x)$** , is shown below. Note that $p'(x)$ has vertical asymptotes at $x = -7$ and $x = 1$, and a vertical tangent line at $x = 5$.



In each part below, select all correct choices. In each part **a.–f.**, there is at least one correct answer.

- a. [2 points] At which of the following x -value(s) does $p(x)$ have a critical point?

–8 –3 –2 1 7

- b. [2 points] At which of the following x -value(s) does $p(x)$ have a local minimum?

–8 –4 –3 0 3

- c. [2 points] On which of the following interval(s) is $p(x)$ increasing on the entire interval?

$(-4, -3)$ $(-3, 0)$ $(1, 2)$ $(3, 7)$

- d. [2 points] On which of the following interval(s) is $p(x)$ concave up on the entire interval?

$(-5, -3)$ $(0, 1)$ $(3, 7)$ $(7, 9)$

- e. [2 points] On which of the following interval(s) is the product $p'(x) \cdot p''(x)$ negative on the entire interval?

$(-5, -4)$ $(-2, 0)$ $(1, 3)$ $(3, 5)$

- f. [2 points] At which of the following x -value(s) does $p(x)$ have both a local extremum and an inflection point?

–7 –5 –3 0 3 NONE OF THESE